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Abstract

This invention pertains to a holey fiber and to a fabrication method for making the fiber. The holey fiber can transmit light by total internal reflection or by Bragg diffraction, can be single mode or multimode and can have solid core or a hollow core. The holey fiber has outside diameter typically of 20 microns to 5 mm, a hollow core of a diameter typically of 0.2 micron to 10 150 microns and longitudinal channels therethrough of a diameter typically of 0.1 micron to 150 microns. The channels are disposed in a desired arrangement with center-to-center distance variation of less than about 2% along the length of the fiber and the cross-section thereof is round that varies less than about 2%. The method includes the steps of stacking structures of at least two different materials of lower and higher softening points in a desired arrangement to form a 15 bundle containing interstices between the structures; heating the bundle to a fusion temperature which is below the softening point of the higher softening point material to form a fused element whereby the lower softening point material softens and flows around the higher softening point material and closes the interstices; removing the structures of the higher softening point material from the fused element to form a preform, thus forming openings in the fused element; and 20 drawing the preform at a draw temperature which is below the softening point of the lower softening point material to form the holey fiber.